



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/565,486

05/04/2006

Bipin S. Parekh

31941033013

2074

21005

7590

07/20/2009

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

530 VIRGINIA ROAD

P.O. BOX 9133

CONCORD, MA 01742-9133

EXAMINER

GREENE, JASON M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

07/20/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,486	Applicant(s) PAREKH ET AL.	
	Examiner Jason M. Greene	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18,22,24 and 44-67 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18,22,24 and 44-67 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date | 6) <input type="checkbox"/> Other: ____. |

1/20/06;5/4/06;8/8/06;8/16/07;8/30/07;11/5/07;6/30/08;12/9/08;4/8/09.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 and 63-67 are rejected under 35 U.S.C. 102(b) as being anticipated by McElroy et al. (US 5,348,691).

McElroy et al. discloses a gas mixture supply system capably of supplying a purge gas comprising a gas source capable of serving as a purge gas, a water source (32,34) and a purge gas generator (29) comprising a moisturizer (10) configured to add moisture to a purge gas, wherein the moisturizer comprises a first region containing a purge gas flow and a second region containing water wherein the first and second regions are separated by a membrane contactor, wherein the membrane contactor comprises a NAFION® membrane (see col. 2, lines 42-55) that is gas permeable and substantially resistant to liquid intrusion in Figs. 1-3 and col. 2, line 34 to col. 5, line 35.

Claim Rejections - 35 USC § 103

Art Unit: 1797

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy et al. (US 5,348,691) in view of International Patent Application Publication WO 00/44479.

McElroy et al. teaches the purge gas mixture comprising at least one purge gas and moisture, but does not teach the membrane contactor forming a hollow fiber wherein one of the first and second regions is within the fiber and the other of the first and second regions is outside the fiber.

WO 00/44479 teaches a similar gas supply system comprising a membrane contactor comprising a bundle of a plurality of gas permeable hollow fiber membranes having a first end and a second end, the membranes having an outer surface and an inner surface, the inner surface comprising a lumen (3) comprising one of the first and second regions, each end of the bundle potted with a liquid tight perfluorinated thermoplastic seal forming a unitary end structure with a perfluorinated thermoplastic housing (see page 22, line 25 to page 23, line 4) wherein the fiber ends are open to fluid flow, the housing having an inner wall and an outer wall, wherein the inner wall defines a fluid flow volume and defines the other of the first and second regions between the inner wall and the hollow fiber membrane, the housing having a purge gas inlet

Art Unit: 1797

connected to gas source and a purge gas mixture outlet, and the housing having a water inlet connected to a water source and a water outlet, wherein either the purge gas inlet is connected to the first end of the bundle and the purge gas mixture outlet is connected to the second end of the bundle or the water inlet is connected to the first end of the bundle and the purge gas outlet is connected to the second end of the bundle, wherein the hollow fiber membrane outer diameter is between 350 and 1450 microns (see page 3, lines 26-29), wherein the hollow fiber membranes have a porous skinned inner surface, a porous outer surface and a porous support surface between, or a skinned porous outer surface, a porous inner surface and a porous support structure between, wherein the purge gas mixture generator is capable of being heated for a sufficient length of time at a temperature sufficient to substantially remove compounds that volatilize at a temperature of 100 °C or less in Fig. 1 and page 2, line 4 to page 26, line 15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the membrane contactor of WO 00/44479 into the system of McElroy et al. to provide a contactor having a very large membrane area per unit volume to allow for a compact assembly, as taught by WO 00/44479 in page 2, line 4 to page 4, line 2.

With regard to claim 8, McElroy et al. teaches providing the water at an elevated temperature to improve humidification rates in col. 4, lines 34-44, but does not explicitly mention a heating device. However, one of ordinary skill in the art at the time the

Art Unit: 1797

invention was made would have recognized that a heating device could be utilized to heat the water to allow a smaller contactor to be used, as taught by McElroy et al. at col. 4, lines 34-44.

With regard to claims 9-11, while McElroy et al. does not explicitly teach the gas source comprising a purifier device, one of ordinary skill in the art would have recognized that a particle filter could (and almost certainly) would be utilized in the purge gas source since such is well known in the art of airplane cabin filtration, which the disclosure of McElroy et al. is most concerned with (see col. 1). Also, the particle filter is inherently regenerable (such as by conventional backflushing). With regard to claim 11, a plurality of particle filters could be used in that duplicating parts for a multiplied effect is merely a choice of design.

With regard to claim 14, WO 00/44479 does not explicitly teach the porous skinned surface having pores 0.001-0.005 μm in diameter, but one of ordinary skill in the art at the time the invention was made would have recognized that the pore diameter could be selected as a matter of design choice.

With regard to claim 16, WO 00/44479 does not explicitly teach the supply system being capable of operation at a purge gas flow rate of at least about 30 l/m, but one of ordinary skill in the art would have recognized that the number and/or length of

Art Unit: 1797

hollow fibers could be selected as a matter of design choice to allow for operation at any purge gas flow rate.

5. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koizumi et al. (US 4,704,348) in view of McElroy et al. (US 5,348,691).

Koizumi et al. discloses a method of humidifying a purge gas comprising passing the purge gas through a moisturizer (16) for a period sufficient to humidify the purge gas in Fig. 2 and col. 2, line 55 to col. 5, line 29.

Koizumi et al. does not teach the moisturizer comprising a first region comprising a purge gas flow and a second region containing water, wherein the first and second regions are separated by a gas-permeable membrane that is substantially resistant to liquid intrusion. However, as noted about McElroy et al. teaches a moisturizer having such a configuration in Figs. 1-3 and col. 2, line 34 to col. 5, line 35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the membrane moisturizer of McElroy et al. into the method of Koizumi et al. since membrane moisturizers are known to have several advantages over other types of humidifiers, as noted by McElroy et al. at col. 1, lines 27-41. One of ordinary skill in the arts of either humidification or lithography would have recognized that excluding bacteria, minerals and/or liquid droplets from the purge gas would be advantageous.

6. Claims 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koizumi et al. (US 4,704,348) and McElroy et al. (US 5,348,691), and further in view of International Patent Application Publication WO 00/44479.

Koizumi et al. and McElroy et al. do not teach the humidifier being a hollow fiber membrane contactor having the recited structure, but as noted above, WO 00/44479 teaches a hollow fiber membrane fluid-fluid contactor having such a structure in Fig. 1 and page 2, line 4 to page 26, line 15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the membrane contactor of WO 00/44479 into the method of Koizumi et al. and McElroy et al. to provide a contactor having a very large membrane area per unit volume to allow for a compact assembly, as taught by WO 00/44479 in page 2, line 4 to page 4, line 2.

7. Claims 44, 46 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koizumi et al. (US 4,704,348) in view of McElroy et al. (US 5,348,691).

Koizumi et al. discloses a lithographic projection apparatus and a method for providing purge gas to at least part of the lithographic apparatus comprising an illuminator (41) configured to provide a projection beam of radiation, a support structure configured to support a patterning device (6), the patterning device configured to pattern the projection beam according to a desired pattern, a substrate table (1) configured to hold a substrate (3), a projection system (5) configured to project the

Art Unit: 1797

patterned beam onto a target portion of the substrate, and at least one purge gas supply system (10) configured to provide a purge gas to at least part of the lithographic projection apparatus comprising a purge gas mixture generator comprising a moisturizer (16) configured to add moisture to a purge gas, the purge gas mixture generator configured to generate a purge gas mixture comprising at least one purge gas and the moisture, and a purge gas mixture outlet connected to the purge gas mixture generator configured to supply the purge gas mixture to the at least part of the lithographic apparatus in Figs. 2 and 7 and col. 2, line 55 to col. 5, line 29.

Koizumi et al. does not teach the moisturizer comprising a first region comprising a purge gas flow and a second region containing water, wherein the first and second regions are separated by a gas-permeable membrane that is substantially resistant to liquid intrusion. However, as noted about McElroy et al. teaches a moisturizer having such a configuration in Figs. 1-3 and col. 2, line 34 to col. 5, line 35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the membrane moisturizer of McElroy et al. into the system of Koizumi et al. since membrane moisturizers are known to have several advantages over other types of humidifiers, as noted by McElroy et al. at col. 1, lines 27-41. One of ordinary skill in the arts of either humidification or lithography would have recognized that excluding bacteria, minerals and/or liquid droplets from the purge gas would be advantageous.

Art Unit: 1797

8. Claims 45, 47 and 51-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koizumi et al. (US 4,704,348) and McElroy et al. (US 5,348,691), and further in view of International Patent Application Publication WO 00/44479.

Koizumi et al. and McElroy et al. do not teach the humidifier being a hollow fiber membrane contactor having the recited structure, but as noted above, WO 00/44479 teaches a hollow fiber membrane fluid-fluid contactor having such a structure in Fig. 1 and page 2, line 4 to page 26, line 15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the membrane contactor of WO 00/44479 into the method of Koizumi et al. and McElroy et al. to provide a contactor having a very large membrane area per unit volume to allow for a compact assembly, as taught by WO 00/44479 in page 2, line 4 to page 4, line 2.

With regard to claim 53, McElroy et al. teaches providing the water at an elevated temperature to improve humidification rates in col. 4, lines 34-44, but does not explicitly mention a heating device. However, one of ordinary skill in the art at the time the invention was made would have recognized that a heating device could be utilized to heat the water to allow a smaller contactor to be used, as taught by McElroy et al. at col. 4, lines 34-44.

With regard to claims 54-56, Koizumi et al. teaches the purge gas source comprising a purifier device (an inherently regenerable pre-filter) in Fig. 2 and col. 3,

Art Unit: 1797

lines 13-16. With regard to claim 56, a plurality of particle filters could be used in that duplicating parts for a multiplied effect is merely a choice of design.

With regard to claim 59, WO 00/44479 does not explicitly teach the porous skinned surface having pores 0.001-0.005 μm in diameter, but one of ordinary skill in the art at the time the invention was made would have recognized that the pore diameter could be selected as a matter of design choice.

With regard to claim 61, WO 00/44479 does not explicitly teach the supply system being capable of operation at a purge gas flow rate of at least about 30 l/m, but one of ordinary skill in the art would have recognized that the number and/or length of hollow fibers could be selected as a matter of design choice to allow for operation at any purge gas flow rate.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Murphy et al., Jackson, Iwamoto, Shimanuki et al., Hesse et al., Berger et al. and Sircar references disclose similar membrane humidifiers.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571)

Art Unit: 1797

272-1157. The examiner can normally be reached on Monday - Friday (9:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason M. Greene
Primary Examiner
Art Unit 1797

/Jason M. Greene/
7/16/09

jmg
July 16, 2009